

Claims 45-58, 84, 105 and 122-141 were rejected under §103 (a) as being unpatentable over Azure (US 5,908,444) in view of Findl (US 4,850,959) and Baugh (US 5,935,516). This rejection is respectfully traversed. Applicants again appreciate the detailed reasoning set forth by the Examiner in the Final Action.

As previously stated, Azure does not disclose or suggest the claimed augmenting at least one function of a biologic structure by “targeting the biologic structure by inducing acoustic resonance” (see Claims 45-58, 84 and 105); or augmenting the growth of an aquatic species by “applying at least one first resonant frequency”, etc.(see claims 122-141).

Applicants refer to Figures 1 and 2 of Azure. A human “patient” 48 is positioned in proximity to a Tesla coil 26 which is connected to a light emitting system 6 containing a plurality of tubes 32. Azure discloses that various gases such as hydrogen, helium, argon, neon, xenon, Krypton, etc., may be contained within the tubes (see, Col. 4, lines 10-11).

Paragraph 7 of the Action does not dispute “Applicant’s assessment of Azure” as reproduced at page 12 of the Action. Rather, the Action states that the combination of these two references is critical and that “Findl is relied upon to teach that electromagnetic resonance (as used by Azure) and acoustic (or ultrasonic) resonance can be used in place of each other in order to influence the biologic functions of a structure.” Applicants respectfully disagree. The **difference between energies and frequencies are critically important.**

Findl arguably discloses that acoustic **energy** can be used in place of electromagnetic **energy**. However, applicants respectfully submit that **frequencies**, as compared to **energies** used to induce resonant frequencies, are **not immediately interchangeable**. Specifically, frequency = velocity divided by wavelength (see present specification at p. 17, lines 8-29). Acoustic velocity is different from electromagnetic velocity, and thus resonant acoustic frequencies are not equivalent to resonant electromagnetic frequencies. Although either of the two waveform energies can be used to stimulate certain resonant frequencies, the actual frequencies themselves are quite different. Findl clearly references interchanging acoustic **energy** with electromagnetic **energy** (see Findl, Col. 3 ll 31-35). However, Applicants believe that this combination of references is fatally flawed because the teachings of Azure are not applicable to acoustic resonance, as intended in the Action.

With regard to Paragraph 8 in the Action, applicants believe that the wording of the claims is specific and Applicants refer the Examiner to the following portions of the specification which have been excerpted and/or summarized for convenience only:

The resonant acoustic frequency of a system is the natural free oscillation frequency of the system. A resonant acoustic system can be excited by a weak mechanical or acoustic driving force in a narrow band of frequencies, close or equal to the resonant frequency thereby inducing acoustic resonance in a **targeted** structure. (p 1, ln 13-15)

The present invention addresses the shortcomings of the prior art by inducing **acoustic resonance in a targeted structure** with **select frequencies that affect the specific targeted structure** but have virtually no effect on nearby, non-resonating structures. (p 4, ln 11-13)

The present invention provides methods to selectively detect, identify and/or affect an inorganic or biologic structure by using resonant acoustic and/or acousto-EM energy which can **transfer useful energy to targeted structures** while leaving nearby structures, which are not in resonance, virtually unchanged. (p 4, ln 19-22)

Conversely, if a **structure is targeted** with EM energy equivalent to its acousto-EM signature, the energy dissipation pathway is reversed, and a state of acoustic resonance can be induced. (p 5, ln 26-28)

In the present invention specific **biologic structures can be targeted** with an acoustic wave or EM energy at power levels that dramatically **affect the target structure, but have virtually no effect on adjacent, nonresonant structures**. (p 6, ln 14-17)

Augmentation, detection, and/or disruption of biologics can be **targeted to specific structures** at power levels that dramatically **affect the target structure, but have virtually no effect on nearby, nonresonant structures**. (p 7 ln 10-12 and ln 16-20).

The present invention provides a method that applies the principles of acoustic resonance to biologic structures for the purpose of disruption and/or augmentation of functions of the **specifically targeted biologic structure**. The resonant acoustic frequency of a biologic structure may be determined by performing resonant acoustic spectroscopy using methods and systems well known in the art. Particularly, a resonant acoustic frequency of a biologic structure may be determined by the steps of:

- a) applying acoustic energy to the biologic structure and scanning through a range of acoustic energy frequencies; and
- b) detecting at least one specific frequency which causes a maximum signal output from the biologic structure indicating the biologic structure being induced into acoustic resonance by the at least specific frequency. (p 8, ln 6-16).

It is postulated that disruption of the targeted biologic structure without affecting nearby tissue or structures occurs due to acoustic resonance being induced only in the targeted structure which until now has not been considered a mechanism to affect a biologic structure. This is very different from that

disclosed in the prior art which contemplates only three mechanisms for affecting a biologic structure which include cavitation, thermal and mechanical. (p 9, ln 24-29)

As such, the present invention applies the principles of acoustic resonance by applying resonant acoustic frequencies and electromagnetic energy equivalent to the ***predetermined acousto-EM signature of a targeted structure*** individually or in combination to affect the targeted structure, the method comprising the steps of :

a) applying at least one resonant acoustic frequency of the targeted structure and/or introducing electromagnetic energy equivalent to part or all of the acousto-EM signature of the targeted structure; and

c) applying (a) and/or (b) each at a power intensity level to induce acoustic resonance within the targeted structure and affect functioning of the structure.

Both the resonant acoustic frequency of the targeted structure and the acousto-EM signature must be predetermined, as discussed above, to provide the applicable energy for inducing acoustic resonance in the structure. The electromagnetic energy can be introduced into the targeted structure in the form of a direct or alternating current have a specific frequency that is equivalent to the electromagnetic energy pattern detected when the structure is induced into acoustic resonance. (p 10, ln 16-30).

Applicants respectfully submit that the meaning of the wording in the claims is clear from the teachings in the specification.

Further, Applicants respectfully request that the Examiner provide references to support the points set forth in the first two Paragraphs of Page 14 in the Action so that Applicants can better respond to the positions set forth therein.

With regard to Paragraph 10 of the Action, Applicants again reiterate that electromagnetic resonance and acoustic resonance are **not** equivalent. Simply stated, acoustic velocities are quite different from electromagnetic velocities which means that resonant **acoustic frequencies** are quite different from resonant **electromagnetic frequencies**.


With regard to the remaining prior art positions stated in the Action, Applicants respectfully submit that the positions are flawed for the reasons summarized above.

Claims 55-57, 125 and 140 were rejected under Section 112, second paragraph. Applicants respectfully traverse the rejection of claims 55-57. In particular, all of the biologic

structures recited in claims 55-57 perform various functions, all of which are well known in the art. Claim 45, from which claims 55-57 depend, recites augmenting at least one function of a biologic structure. Applicants believe that these claims are definite within the meanings of Section 112, second paragraph.

Accordingly, in view of the Remarks contained herein, a Notice of Allowance directed to Claims 45-58, 84, 105 and 122-141 is respectfully requested.

Respectfully submitted,


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